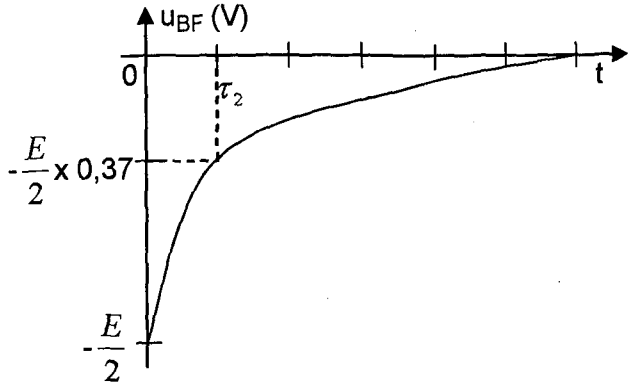
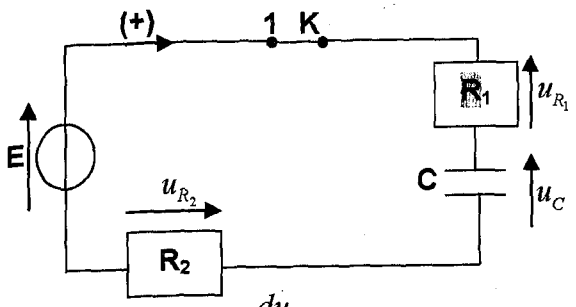
4°/ $u_{FM} + u_{BF} + u_{AB} = 0$ or $u_{FM} = u_{BF}$ alors $2\,u_{BF} = 2R_3\,i = -u_{AB}$ d'où $i = -\frac{u_{AB}}{2R_3}$ .AN: $i = -\frac{6}{2\times 5.10^3} = -6.10^{-4}$A.

5°/ $u_{BF} = -R_3\frac{E}{(R_2+R_3)}e^{-\frac{t}{\tau_2}} = -\frac{E}{2}e^{-\frac{t}{\tau_2}}$.

t	0	τ_2	$+\infty$
u_{BF} (V)	$-\frac{E}{2} = -5$	$-\frac{E}{2}e^{-1} = -\frac{E}{2} \times 0{,}37$ $= -1{,}85$	0



Exercice N°3 :



1°/ D'après la loi des mailles : $u_C(t) + u_{R_1}(t) + u_{R_2}(t) = E$

alors $u_C + (R_1 + R_2)\,i = E$ or $R_2 = 3.R_1$.

$i = \frac{dq}{dt} = C\frac{du_C}{dt}$ et $R_2 = 3R_1$ alors $4R_1C\frac{du_C}{dt} + u_C = E$.

On pose $\tau = 4R_1C$. L'équation différentielle s'écrit alors sous la forme de : $\tau\frac{du_C}{dt} + u_C = E$. **(I)**

2°/ $u_C(t) = A.(1 - e^{-\alpha t})$ **(1)** et $\frac{du_c(t)}{dt} = A\alpha . e^{-\alpha t}$ **(2)**.

(1) et **(2)** dans **(I)** alors $4R_1C\alpha\, A.e^{-\alpha t} + A - A e^{-\alpha t} = E$ alors $A e^{-\alpha t}(4R_1C\,\alpha - 1) + A = E$ par identification alors on a : $A = E$ et $4R_1C\,\alpha - 1 = 0$ alors $\alpha = \frac{1}{4R_1C} = \frac{1}{\tau}$ donc $u_C(t) = E.(1 - e^{-\frac{t}{4R_1C}})$.

3°/a- $\tau\frac{du_C}{dt} + u_C = E \Rightarrow \tau = \frac{E - u_C}{\frac{du_C}{dt}}$ en dimension $[\tau] = \frac{[E-u_C]\to(V)}{\left[\frac{du_C}{dt}\right]\to(V.s^{-1})} = (s)$.